

ADVANCED REACTOR, FUEL CYCLE, AND ENERGY PRODUCTS WORKSHOP FOR UNIVERSITIES

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AFCR&D

Transmutation Science

Los Alamos National Laboratory

***Workshop for Universities
Hilton Hotel, Gaithersburg, MD
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Area Overall Work Scope

- Transmutation Science Provides Nuclear Data and Advanced Materials to Realize GNEP Goals
 - Nuclear data
 - Structural materials
 - Materials test station
 - Nuclear coolant and advanced alloys
- Priorities
 - High accuracy cross section data for specific isotopes
 - Scientific understanding of materials behaviors under extreme conditions (corrosion, high temperature and irradiation)

FY06 ACCOMPLISHMENTS

- *Completed Np237 fission cross section measurement over ten decades in incident neutron energy; also collected all data needed for Pu242, Pu240*
- *Completed Pu242 capture cross section measurement using DANCE detector, and collected capture data for Pu240*
- *Performed small scale mechanical testing of STIP-II irradiated samples in hot cells*
- *Made significant progress on multi-scale modeling of ferritic steels*

FY06 ACCOMPLISHMENTS (cont'd)

- *A multi-lab team continued design work on Materials Test Station (MTS) - if constructed, MTS will be the only fast-spectrum neutron irradiation facility in US for more than a decade*
- *Completed a round of MTS design options review*
- *Continued materials testing and development, especially ODS steels, in DELTA and for a lead correlation stand*
- *Improved DELTA coolant chemistry control and completed a study on oxygen effects on heat transfer*
- *Completed a Pb/LBE corrosion test database and performed a model-based analysis*

WORK IN PROGRESS FOR FY07

- *Complete Pu242 fission and Pu240 capture analyses, deliver data to evaluators*
- *Update MTS design with LBE coolant, conduct safety and thermal hydraulics analyses and testing*
- *Retrieve 100-200 dpa FFTF MOTA specimens and 160 dpa ACO3 duct*
- *Calculate point-defect energies in Fe-Cr system, and study irradiation creep with viscoplasticity code*
- *Conduct irradiation and corrosion experiment with proton beam*
- *Conduct extended materials testing and MTS component testing in DELTA*

PLANS FOR FY08-09

- *Complete Pu240 fission analysis and take Pu239 capture data with DANCE*
- *Complete MTS design and pre-construction tests*
- *Extend atomistic modeling of alloy (Cr, Si, Mo, C ...) effects on mechanical properties*
- *Analyze FFTF specimens, prepare for and support MEGAPIE, STIP-V (PSI), MATRIX-SMI, FUTRIX-MI (Phenix), JOYO/BOR-60 irradiations*
- *Continue irradiation and corrosion tests associated with advanced alloy development*

Transmutation Science Break-out

Session - Frederick Suite 3:45-5:45PM

- Priorities, highlights and needs explained in details
- Program/laboratory contact information
- 3:45-4:15pm - Nuclear Data
- 4:30-5:45pm - Structural Materials & MTS

